



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/664,547

09/19/2003

Theodore W. Houston

TI-32205.1

4290

23494 7590 05/04/2009  
TEXAS INSTRUMENTS INCORPORATED  
P O BOX 655474, M/S 3999  
DALLAS, TX 75265

EXAMINER

LEWIS, MONICA

ART UNIT

PAPER NUMBER

2894

NOTIFICATION DATE

DELIVERY MODE

05/04/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com



UNITED STATES PATENT AND TRADEMARK OFFICE

---

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/664,547  
Filing Date: September 19, 2003  
Appellant(s): HOUSTON, THEODORE W.

---

Rose Alyssa Keagy  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 12/28/08 appealing from the Office action mailed 8/20/08.

Art Unit: 2894

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect.

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: a) Whether claims 49-52 and 54 are unpatentable under 35 U.S.C. 103(a) as obvious over Turner (U.S. Patent No. 5,357,132) in view of Kurosawa et al. (U.S. Patent No. 4,951,175); and b) Whether claim 53 is unpatentable under 35 U.S.C. 103(a) as obvious over Turner (U.S. Patent No. 5,357,132) in view of Kurosawa et al. (U.S. Patent No. 4,951,175) and Fisher et al. (U.S. Patent No. 5,962,885).

Art Unit: 2894

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

5,357,132	Turner	10-1994
4,951,175	Krosawa et al.	08-1990
5,962,885	Fisher et al.	10-1999

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 49-52 and 54 are rejected under 35 U.S.C. 103(a) as obvious over Turner (U.S. Patent No. 5,357,132) in view of Kurosawa et al. (U.S. Patent No. 4,951,175).

In regards to claim 49, Turner discloses the following:

a) a first insulating layer (66) disposed between a substrate and a first metal layer (68) (For Example: See Figure 9);

b) a trench defined by a recess in the first insulating layer (For Example: See Figure 9);

c) a first contact pillar (64) extending substantially from a top surface of the substrate to a bottom surface of the first metal layer (68) within the trench (For Example: See Figure 9); and

Art Unit: 2894

d) a capacitor formed in the trench overlying the first contact pillar such that the capacitor is formed at least in part on a side of the first contact pillar, and the first contact pillar is a plate of the capacitor (For Example: See Column 6 Lines 46-50).

In regards to claim 49, Turner fails to disclose the following:

a) the trench does not extend beyond the top surface of the substrate.

However, Kurosawa et al. ("Kurosawa") discloses that the trench does not extend beyond the top surface of the substrate (For Example: See Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Turner to include a trench that does not extend beyond the top surface of the substrate as disclosed Kurosawa in because it aids in providing high integration density (For Example: See Column 2 Lines 1-8).

Additionally, since Turner and Kurosawa are both from the same field of endeavor (semiconductors), the purpose disclosed by Kurosawa would have been recognized in the pertinent art of Turner.

In regards to claim 50, Turner discloses the following:

a) a second contact pillar (62) extending substantially from a top surface of the substrate to a bottom surface of another portion of the first metal layer wherein the second contact pillar is substantially the same height as the first contact pillar (For Example: See Figure 9).

In regards to claim 51, Turner discloses the following:

a) the capacitor comprises a storage element of a memory cell (For Example: See Column 1 Lines 15-25).

In regards to claim 52, Turner discloses the following:

a) a storage node of the storage element comprises a first contact pillar (For Example: See Abstract).

Art Unit: 2894

In regards to claim 54, Turner discloses the following:

a) the second contact pillar is a bit line contact pillar (76 and 78) (For Example: See Figure 11).

Claim 53 is rejected under 35 U.S.C. 103(a) as obvious over Turner (U.S. Patent No. 5,357,132) in view of Kurosawa et al. (U.S. Patent No. 4,951,175) and Fisher et al. (U.S. Patent No. 5,962,885).

In regards to claim 53, Turner fails to disclose the following:

a) a storage node further comprises a conducting layer lining the trench and the side of the first contact pillar.

However, Fisher et al. ("Fisher") discloses the use of a storage node further that comprises a conducting layer (80) lining the trench and the side of the first contact pillar (70) (For Example: See Figure 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Turner to include storage node that comprises a conducting layer lining the trench and the side of the first contact pillar as disclosed in Fisher because it aids in increasing capacitance (For Example: See Column 1 Lines 51 and 52).

Additionally, since Turner and Fisher are both from the same field of endeavor (semiconductors), the purpose disclosed by Fisher would have been recognized in the pertinent art of Turner.

**(10) Response to Argument**

**APPELLANT'S ARGUMENTS:**

1) The Appellant argues that "Turner does not teach a first contact pillar extending substantially to a bottom surface of the first metal layer within the trench...Kurosawa et al. does not teach a first contact pillar extending substantially to a bottom surface of the first metal layer within the trench."

2) The Appellant argues that "the first metal layer of Turner cannot be element 68 because element 68 of Turner is part of the capacitor...and the capacitor is a separately claimed element from the first metal layer in the Appellant's Claim 49."

3) The Appellant argues that "Turner teaches away from being combined with Kurosawa et al.'s teaching of the present invention is addressed to a specific semiconductor memory device which has a memory cell with a stacked capacitor cell...one having ordinary skill in the art at the time of the invention would not modify Turner to include the trench disclosed in Kurosawa et al. because the trench...taught by Turner is an isolation trench...and the trench of Kurosawa et al...cannot be an isolation trench."

4) The Appellant argues that "Turner does not teach a second contact pillar extending substantially to a bottom surface of the first metal layer within the trench...Kurosawa et al. does not teach a second contact pillar extending substantially to a bottom surface of the first metal layer within the trench."

5) The Appellant argues that "the combination of Turner and Kurosawa et al. also does not teach a capacitor that is formed in the trench overlying a first contact pillar extending substantially to a bottom surface of the first metal layer."

Art Unit: 2894

6) The Appellant argues that “Turner does not teach a bit line contact pillar that is substantially the same height as the contact pillar.”

7) The Appellant argues that “Fischer does not teach a conducting layer lining the side of the first contact pillar that extends substantially to a bottom surface of the first metal layer within the trench...Turner does not teach a conducting layer lining the side of the first contact pillar that extends substantially to a bottom surface of the first metal layer within the trench...Kurosawa does not teach a conducting layer lining the side of the first contact pillar that extends substantially to a bottom surface of the first metal layer within the trench.”

EXAMINER’S RESPONSE:

1) Turner discloses a first contact pillar (64) extending substantially from a top surface of the substrate to a bottom surface of the first metal layer (68) within the trench (For Example: See Figure 9). Additionally, Kurosawa discloses that the trench does not extend beyond the top surface of the substrate (For Example: See Figure 2). Finally, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

2) There is nothing in the claim that precludes the first metal layer from being a separately claimed element from the capacitor.

3) It is not clear what Applicant is arguing because both references disclose Dynamic Random Access Memory devices that have capacitors disclosed in the trenches. Finally, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Turner to include a trench that does



Art Unit: 2894

not extend beyond the top surface of the substrate as disclosed in Kurosawa because it aids in providing high integration density (For Example: See Column 2 Lines 1-8).

4) Turner discloses a second contact pillar (62) extending substantially from a top surface of the substrate to a bottom surface of the first metal layer (68) within the trench (For Example: See Figure 9). Additionally, Kurosawa was not utilized to disclose that limitation.

5) Turner discloses a first contact pillar (64) extending substantially from a top surface of the substrate to a bottom surface of the first metal layer (68) within the trench and a capacitor formed in the trench overlying the first contact pillar (For Example: See Figure 9 and Column 6 Lines 46-50).

6) A bit line contact pillar that is substantially the same height as the contact pillar is not disclosed in the claims. Therefore, Applicant is arguing limitations that are not present in the claims.

7) Turner and Kurosawa were not utilized to disclose “a conducting layer lining the trench and the side of the first contact pillar.” Fischer was utilized to disclose a conducting layer (80) lining the trench and the side of the first contact pillar (70) (For Example: See Figure 6). Finally, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Art Unit: 2894

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Monica Lewis/

Conferees:

Monica Lewis /ML/

/Kimberly D Nguyen/  
Supervisory Patent Examiner, Art Unit 2894

T. C. Patel  
/T C Patel/  
Supervisory Patent Examiner, Art Unit 2839